## Space Weather Forecast

Issued on Monday 9 December 2024 at 13:01 Local

**This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales**

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**Space Weather Forecast Headline: Chance of Moderate class flares with a Slight Chance of isolated Strong Flares, G1/Minor storms and Solar Radiation storms.**

**Analysis of Space Weather Activity over past 24 hours**

**Solar Activity:** Moderate activity with a Moderate flare at 08/1611 UTC, most likely from a region in the southwest.

There are currently six sunspot regions on the Earth-facing disc. The region in the southwest that produced the earlier Strong flare and more recent Moderate flare and another sunspot region in the central southern disc are looking the most magnetically complex. Given yesterdays Strong-class flare, further flares must be considered. There are several regions in the centre southern hemisphere of the disc that are within close proximity to each other, increasing the likelihood of interaction between them. Other regions appear small and simple at the present time.

Following on from the Strong flare on the 08 Dec, analysis suggests that the resulting Coronal Mass Ejection (CME) is likely to pass ahead of Earth's orbit, with no or limited impacts at Earth. No other Earth directed CMEs were seen in the last 24 hours.

**Solar Wind / Geomagnetic Activity:** Solar winds showed signs of connecting to a fast wind from a coronal hole in the centre of the disc. Wind speeds increased from background levels, around 350 km/s, to slightly elevated near 500 km/s, with a brief maximum wind speed of 550km/s around 09/0700 UTC. The Interplanetary Magnetic Field has been largely moderate with the north-south component being mainly weakly south directed, with brief periods of weakly northerly. Largely Quiet geomagnetic activity with an Active interval between 09/0000-09/0300 UTC.

**Energetic Particles / Solar Radiation:** No solar radiation storms were observed.

**Four-Day Space Weather Forecast Summary**

**Solar Activity:** A Chance of further Moderate class flares, with a Slight Chance of isolated Strong flares, this risk decreasing slightly after the region responsible for the recent Strong flare rotates off the disc.

**Solar Wind / Geomagnetic Activity:** No Earth directed CMEs are currently expected. Wind speeds are likely to be slightly elevated for much of this period, due to a fast wind connection from a coronal hole.

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As a result, Quiet to Unsettled geomagnetic conditions are expected with a Chance of Active intervals and a Slight Chance of G1/minor storms.

**Energetic Particles / Solar Radiation:** There is a Slight Chance of solar radiation rising above the S1/Minor Radiation Storm threshold, mainly due to the region which produced the Strong flare on the 08 Dec.

## Geomagnetic Storms

| Geomagnetic Storm<br>Probability (Exceedance) | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC)<br>(%) | Day 2 (00-24 UTC)<br>(%) | Day 3 (00-24 UTC)<br>(%) | Day 4 (00-24 UTC)<br>(%) |
|---|---|---|---|---|---|---|
| Minor or Moderate | G1 to G2 | No | 10 | 10 | 5 | 1 |
| Strong | G3 | No | 1 | 1 | 1 | 1 |
| Severe | G4 | No | 1 | 1 | 1 | 1 |
| Extreme | G5 | No | 1 | 1 | 1 | 1 |

## Radio Blackouts - X-Ray Flares

| X-Ray Flares<br>Probability | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC)<br>(%) | Day 2 (00-24 UTC)<br>(%) | Day 3 (00-24 UTC)<br>(%) | Day 4 (00-24 UTC)<br>(%) |
|---|---|---|---|---|---|---|
| Active | R1-R2 (M Class) | Yes | 50 | 50 | 50 | 50 |
| Very Active | R3-R5 (X Class) | No | 10 | 10 | 10 | 5 |

## Solar Radiation Storms (High Energy Protons)

| Radiation Storms<br>Probability (Exceedance) | Level ($cm^{-2}sr^{-1}s^{-1}$) | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC)<br>(%) | Day 2 (00-24 UTC)<br>(%) | Day 3 (00-24 UTC)<br>(%) | Day 4 (00-24 UTC)<br>(%) |
|---|---|---|---|---|---|---|
| Active | ≥ S1 | No | 10 | 10 | 10 | 10 |
| Very Active | ≥ S3 * | No | 1 | 1 | 1 | 1 |
| * S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$) | | | | | | |

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